

CLAIMS

What is claimed is:

1. An optical pickup actuator for use with an objective lens on a base, comprising:
a blade holding the objective lens;
a plurality of suspension wires supporting the blade on the base so that the blade is elastically movable;
a magnetic element positioned on the base; and
a coil positioned horizontally on the blade to generate an electromagnetic force in a focusing and/or tilting direction through an interaction with the magnetic element,

wherein the coil is divided into a plurality of subcoils, where each subcoil is separated from an adjacent subcoil in a vertical direction.
2. The optical pickup actuator according to claim 1, wherein the coil comprises a pair of first coils positioned on the blade in a first direction and facing each other with respect to the objective lens.
3. The optical pickup actuator according to claim 1, wherein the coil comprises a coil surrounding an outer surface of the blade.
4. The optical pickup actuator according to claim 2, further comprising a second coil positioned vertically on a side of the blade in a second direction substantially perpendicular to the first direction, the second coil generating an electromagnetic force in a tracking direction through interaction with the magnetic element.
5. The optical pickup actuator according to claim 4, wherein the second coil is positioned on both sides of the blade.
6. The optical pickup actuator according to claim 4, further comprising an inner yoke positioned on the base and positioned within a cavity defined by walls of the first coil,

wherein the inner yoke has a pair of first walls disposed opposite the second coil and separated from each other in the second direction.

7. The optical pickup actuator according claim 5, further comprising an inner yoke positioned on the base and positioned within a cavity defined by walls of the first coil, wherein the inner yoke has a pair of first walls disposed opposite the second coil and separated from each other in the second direction.

8. The optical pickup actuator according to claim 1, wherein the magnetic element comprises a pair of unipolar magnets disposed opposite each other with respect to the blade and have the same polarity.

9. The optical pickup actuator according to claim 4, wherein the magnetic element comprises a pair of unipolar magnets disposed opposite each other with respect to the blade in the second direction and have the same polarity.

10. The optical pickup actuator according to claim 1, further comprising three stoppers interposed between the blade and the base for preventing the blade from colliding with the base when excessively driven toward the base and arranged in a triangular shape centered on the objective lens.

11. An optical disc drive for a disc that is a recording medium, comprising:
a spindle motor for rotating the disc ;
an optical pickup for recording and/or reproducing information by emitting light onto the disc through an objective lens ; and
an optical pickup actuator for controlling a position of the objective lens so that the emitted light is focused on a desired position of the disc, the optical pickup actuator comprising:
a blade holding the objective lens,
a plurality of suspension wires supporting the blade on a base so that the blade is elastically movable,
a magnetic element positioned on the base, and
a coil positioned horizontally on the blade to generate an electromagnetic force in a focusing direction and/or a tilting direction through interaction with the magnetic element,

wherein the coil is divided into a plurality of subcoils, where each subcoil is separated from an adjacent subcoil in a vertical direction.

12. The optical disc drive according to claim 11, wherein the coil comprises a pair of first coils positioned on the blade in a first direction so as to face each other with respect to the objective lens.

13. The optical disc drive according to claim 11, wherein the coil comprises a coil positioned on the blade so as to surround an outer surface of the blade.

14. The optical disc drive according to claim 12, wherein the optical pickup actuator further comprises a second coil positioned vertically on a side of the blade in a second direction substantially perpendicular to the first direction, the second coil generating an electromagnetic force in a tracking direction through interaction with the magnetic element.

15. The optical disc drive according to claim 14, wherein the second coil is positioned on both sides of the blade.

16. The optical disc drive according to claim 14, wherein the optical pickup actuator further comprises an inner yoke positioned on the base and placed inside the first coil, and wherein the inner yoke has a pair of first walls disposed opposite the second coil and separated from each other in the second direction.

17. The optical disc drive according to claim 14, wherein the magnetic element comprises a pair of unipolar magnets disposed opposite each other with respect to the blade in the second direction and have the same polarity.

18. The optical disc drive according to claim 11, wherein the optical pickup actuator further comprises three stoppers interposed between the blade and the base for preventing the blade from colliding with the base when excessively driven toward the base and arranged in a triangular shape centered on the objective lens.

19. An optical pickup actuator for use with an objective lens on a base, comprising:

a blade holding the objective lens;
a plurality of suspension wires supporting the blade on the base so that the blade is elastically movable;
a pair of first coils positioned horizontally on the blade and disposed opposite each other with respect to the objective lens in a first direction;
a second coil positioned vertically on a side of the blade in a second direction perpendicular to the first direction; and
an inner yoke positioned on the base, the inner yoke positioned inside a cavity defined by each of the first coils,
wherein the inner yoke has a pair of first walls disposed opposite the second coil and separated from each other in the second direction.

20. The optical pickup actuator according to claim 19, wherein each of the first coils is divided into a plurality of subcoils, where each subcoil is separated from an adjacent subcoil in a vertical direction.

21. The optical pickup actuator according to claim 19, further comprising a third coil positioned so as to surround the sides of the blade.

22. The optical pickup actuator according to claim 21, wherein the third coil is divided into a plurality of subcoils that are vertically separated from one another.

23. The optical pickup actuator according to claim 19, further comprising a pair of unipolar magnets disposed opposite each to other with respect to the blade in the second direction and have the same polarity.

24. The optical pickup actuator according to claim 19, further comprising three stoppers interposed between the blade and the base for preventing the blade from colliding with the base when excessively driven toward the base and arranged in a triangular shape centered on the objective lens.

25. The optical pickup actuator according to claim 19, wherein the second coil is positioned vertically on both sides of the blade in the second.

26. An optical disc drive for a disc that is a recording medium, comprising:
a spindle motor for rotating the disc ;
an optical pickup for recording and/or reproducing information by emitting light focuses onto the disc through an objective lens ; and
an optical pickup actuator for controlling a position of the objective lens so that the emitted light is focused on a desired position of the disc, the optical pickup actuator comprising:
a blade holding the objective lens and supported on a base by a plurality of suspension wires so that the blade is elastically movable,
a pair of first coils positioned horizontally on the blade and disposed opposite each other with respect to the objective lens in a first direction,
a second coil positioned vertically on a side of the blade in a second direction perpendicular to the first direction, and
an inner yoke positioned on the base, the inner yoke positioned inside a cavity formed by walls of each of the first coils,
wherein the inner yoke has a pair of first walls disposed opposite the second coil and separated from each other in the second direction.
27. The optical disc drive according to claim 26, wherein each of the first coils is divided into a plurality of subcoils, where each subcoil is separated from an adjacent subcoil in the vertical direction.
28. The optical disc drive according to claim 26, wherein the optical pickup actuator further comprises a third coil positioned to surround the sides of the blade.
29. The optical disc drive according to claim 28, wherein the third coil is divided into a plurality of subcoils, where each subcoil is separated from an adjacent subcoil in the vertical direction.
30. The optical disc drive according to claim 26, wherein the optical pickup actuator further comprises a pair of unipolar magnets disposed opposite to each other with respect to the blade in the second direction and have the same polarity.

31. The optical disc drive according to claim 26, wherein the optical pickup actuator further comprises three stoppers interposed between the blade and the base for preventing the blade from colliding with the base when excessively driven toward the base and arranged in a triangular shape centered on the objective lens.

32. An optical pickup actuator for use with an objective lens on a base, comprising:
a blade holding the objective lens;
a plurality of suspension wires supporting the blade on the base so that the blade is elastically movable; and
three stoppers interposed between the blade and the base for preventing the blade from colliding with the base when excessively driven toward the base and arranged in a triangular shape centered on the objective lens.

33. The optical pickup actuator according to claim 32, wherein the stoppers are positioned on the blade.

34. The optical pickup actuator according to claim 32, wherein the stoppers are positioned on the base.

35. An optical disc drive for a disc that is a recording medium, comprising:
a spindle motor for rotating the disc ;
an optical pickup for recording and/or reproducing information by emitting light focused onto the disc through an objective lens ; and
an optical pickup actuator for controlling a position of the objective lens so that the emitted light is focused on a desired position of the disc, the optical pickup actuator comprising:
a blade holding the objective lens;
a plurality of suspension wires supporting the blade on the base so that the blade is elastically movable; and
three stoppers interposed between the blade and the base for preventing the blade from colliding with the base when excessively driven toward the base and arranged in a triangular shape centered on the objective lens.

36. The optical disc drive according to claim 35, wherein the stoppers are positioned on the blade.

37. The optical disc drive according to claim 35, wherein the stoppers are positioned on the base.

38. An optical pickup actuator for use with an objective lens on a base, comprising:
a blade holding the objective lens;
a plurality of suspension wires movingly supporting the blade on the base;
a pair of unipolar magnets positioned on the base; and
a plurality of coils positioned on the blade and interacting with the unipolar magnets to create an electromagnet force to move the blade; and
an inner yoke positioned inside a cavity defined by the walls of a coil, wherein the yoke comprises three sections with each of the three sections of the yoke being parallel to a different wall of the cavity to increase an effective area facing the magnets.

39. The optical pickup actuator according to claim 38, wherein one of the coils is divided into a plurality of subcoils that are separated from one another.

40. The optical pickup actuator according to claim 38, wherein one of the coils is positioned to surround the sides of the blade.

41. The optical pickup actuator according to claim 38, wherein the base has only a single pair of unipolar magnets

42. An optical pickup actuator for use with an objective lens on a base, comprising:
a blade holding the objective lens;
a plurality of suspension wires movingly supporting the blade on the base;
a plurality of hinges each of coupled to an end of a suspension wire;
a pair of unipolar magnets positioned on the base; and
a plurality of coils connected to an electric circuit and interacting with the unipolar magnets to create an electromagnet force to move the blade; and
wherein at least one of the plurality of coils is divided into subcoils and a hinge coupled to each of the plurality of suspension wires is between an adjacent pair of subcoils.

43. The optical pickup actuator according to claim 42, wherein the plurality of suspension wires are at least six suspension wires and the coil is divided into three or more subcoils.

44. The optical pickup actuator according to claim 42, wherein a first hinge and a second hinge are positioned on each of a top and a bottom of one of the coils, respectively, and a third hinge is positioned between two of the subcoils.

45. The optical pickup actuator according to claim 42, wherein the coils are focus and tracking coils and the electric circuit supplies current to the coils in the same direction.

46. The optical pickup actuator according to claim 42, wherein the coils are focus and tracking coils, of which the focus coil also serves as a tilt coil and the electric circuit supplies current separately to each of the coils.

47. The optical pickup actuator according to claim 42, wherein the coils are focus, tracking, and tilt coils and the circuit supplies current to the coils in opposite directions.